

Remarks

Reconsideration of the application is urged in view of the amendments above and comments which follow.

Turning first to the objection to claim 17 identified in numbered section 3 on page 2 of the office action, the examiner is quite correct regarding the error in the claim, and the correction suggested by the examiner has been effected above.

In numbered section 4 on page 3 of the office action, the examiner has rejected claim 17 under 35 U.S.C. §102 as being anticipated by Masuda U.S. Patent Number 5,086,689. Claim 17 is the only independent claim in the application. Then, in numbered sections 5 and 6, the examiner has rejected claims 19, 22, 23, 27 and 35 under 35 U.S.C. §103, again with Masuda being the primary reference. The remaining claims have been indicated by the examiner in numbered section 8 on page 5 of the office action to contain allowable subject matter. While the indication of allowable subject matter is most gratefully acknowledged, given the amendments above and comments following below, it is submitted that all claims are in condition for allowance.

The invention of the present application is directed to an axial piston micropump whose purpose is to achieve a minimized working fluid flow, while maintaining high accuracy and a long operational life. In accordance with the preferred form of the invention set forth in the specification of the present application, this is achieved by operating only one cylinder as a working cylinder, and by using the other cylinder or cylinders, located in the cylinder drum, as blind balancing cylinders which do not contribute to the displacement of fluid. As a result, the highly desired symmetrical load on the cylinder drum, swash plate and bearings of the axial piston pump can be maintained, and tilting movements of the cylinder drum are avoided.

The Masuda reference cited by the examiner does show an axial piston machine which has a form of balancing cylinders. As illustrated and described in Masuda, the working pistons

of the axial piston machine are in sliding contact with the swash plate. The balancing cylinders are intended to compensate for abrupt pressure changes in the cylinders when, during rotation of the drum, the cylinders are shifted from the suction port to the discharge port of the valve plate. The compensation is achieved by two symmetrically-located fixed compensation cylinders, which are not part of the rotating cylinder drum. Controlled pressure equalization between the working and compensation cylinders is achieved through flow control means during the transition of the working cylinders from port to port, where a working cylinder in the vicinity of the upper and lower deadpoints shifts from suction to discharge pressure and vice versa. It is clear from Masuda, however, that all of the cylinders formed in the cylinder drum are, in fact, working cylinders which contribute to fluid flow.

Claim 17 has therefore been amended to make the differences between the invention and Masuda more clear. Claim 17 has the added clause, concluding the claim, that each of the balancing cylinders is located in the cylinder drum. This clearly distinguishes from Masuda, whose “balancing” cylinders are not located in the cylinder drum, and are in fixed positions.

The remaining references have been considered, and it is believed that none of the references, alone or in combination, suggests the novel features of amended claim 17. None of the references minimize the displacement of the pump by providing balancing pistons in the rotating cylinder drum which do not contribute to fluid flow, but only maintain the force balance on the swash plate.

It is therefore submitted that claim 17 is allowable over the prior art, and the remaining claims, which depend directly or indirectly from claim 17, are allowable, as well. When reviewing the claims, claim 19 has been amended slightly to remove the concluding clause which could be confusing. The claim still is directed to the use of the resilient ring in the same manner as the unamended claim.

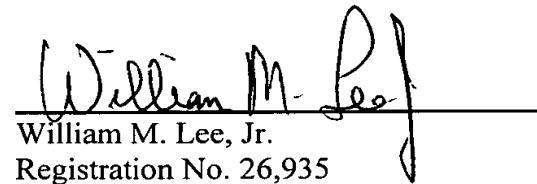
Given the above, it is submitted that the application is now in condition for allowance,

and the examiner's further and favorable reconsideration in that regard is urged.

As this response is being submitted during the fourth month following the examiner's office action, an appropriate petition for extension of time is also submitted herewith.

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Respectfully submitted,



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